

form an inflection point at a certain frequency f_0 , and the phase changes at this inflection point. However, the inflection point is not clear in FIG. 19A which shows the result of the conventional example.

On the other hand, in FIG. 19B which shows the result of the present example, the hyperbola, straight line, and inflection point are clear at the frequency f_0 , it is obvious that the impedance is measured correctly.

It is desirable to use copper lead wires 101a to 101h because of low specific resistivity to reduce the restriction on the current due to impedance of the lead wires 101a to 101h. The use of copper wire is advantageous also in that the parasitic capacitance between an object to be measure and the lead wires can be reduced.

Next, a method for measuring the impedance of the path of the plasma treatment equipment shown in FIG. 1 from the feeder plate 3, to plasma excitation electrode (cathode) 4, plasma space 60, susceptor electrode 8, horizontal part of the shield 12, metal plates 80a and 80b, bottom 10b of the chamber wall 10, side wall 10s of the chamber wall 10, and housing 21 by use of the impedance measurement tool described in the present embodiment is described with reference to FIG. 21.

First, the high frequency power source 1 and the matching box 2 of the plasma treatment equipment is taken out from the plasma treatment equipment. The lead wire 110 of the probe 105 of the impedance measurement tool is connected to the lead wire 113 which connects between the matching box 2 and the feeder plate 3. Next, the crimp-style terminals 102a to 102h connected to the lead wires 101a to 101h of the impedance measurement tool are screwed with screws 114 on the housing 21 of the plasma treatment equipment so as to be approximately point symmetrical with respect to the center of the feeder plate 3. After the impedance measurement tool is arranged as described herein above, a measurement signal is supplied to the lead wire 110, and the impedance of the path from the feeder plate 3 of the plasma treatment equipment to the housing 21 through the plasma space 60 is measured.

For measurement, the fixture is attached to the measurement probe which has been calibrated at 0 S, 0 Ω , and 50 Ω , at that time the influence of the residual impedance of the fixture can be solved by open and short correction. The same effect is obtained by calibration of the probe having the attached fixture as shown in FIG. 20.

Second Embodiment of Impedance Measurement Tool

The second embodiment of an impedance measurement tool in accordance with the present invention is described with reference to FIG. 18. This impedance measurement tool is used for measuring a large sized object to be measured, in this case a shorting lead wire 105 is provided to short between a plurality of lead wires 101a to 101h.

The impedance of the testing tool can be reduced by use of this impedance measurement tool because the path of measurement current increases. As the result, the proportion of the impedance of the object to be measured to the impedance of the whole measurement system including the object to be measured becomes high, and the impedance is measured at higher accuracy.

Third Embodiment of Impedance Measurement Tool

The third embodiment of an impedance measurement tool of the present invention is shown in FIG. 22. This embodi-

ment is different from the first embodiment in that one ends of a plurality of lead wires 101a to 101h described in the above-mentioned first embodiment are connected by soldering directly to soldering terminals 121 on the peripheral conductor 111 of the probe 105 without the probe attachment, and other structures are the same as those of the above-mentioned first embodiment. The same effect as obtained by use of the impedance measurement tool of the present invention in accordance with the first embodiment is obtained by applying this embodiment.

According to the present invention, the power consumption efficiency is improved, the film forming speed is faster, and the better film quality is realized. Furthermore, the susceptor impedance is reduced and the frequency dependency is reduced.

What is claimed is:

1. Plasma treatment equipment in which a chamber wall and a susceptor electrode having the same DC potential are AC shorted to each other.

2. The plasma treatment equipment according to claim 1, wherein said chamber wall and said susceptor electrode are shorted to each other at a location that is within a distance shorter than 500 mm from a side wall of the chamber wall.

3. The plasma treatment equipment according to claim 1, wherein said susceptor electrode is shorted to said chamber wall at a short point on a bottom wall of the chamber wall, said short point being located within a distance shorter than 500 mm from a side wall of the chamber wall as measured along the bottom wall.

4. The plasma treatment equipment according to claim 3, wherein said susceptor electrode is shorted to said chamber wall by a metal plate, said metal plate being connected between the short point on the bottom wall and a second short point on a shield of the susceptor electrode.

5. The plasma treatment equipment according to claim 3, wherein the said metal plate is inclined with respect to the bottom wall, and an angle formed between said metal plate and the bottom wall is less than 45 degrees.

6. The plasma treatment equipment according to claim 1, wherein said chamber wall and said susceptor electrode are shorted at a plurality of short points.

7. The plasma treatment equipment according to claim 6, wherein the plurality of short points are disposed approximately symmetrically with respect to a center of said susceptor electrode.

8. The plasma treatment equipment according to claim 6, wherein the plurality of short points are disposed approximately symmetrically with respect to a center of a shield of said susceptor electrode.

9. The plasma treatment equipment according to claim 1, wherein said susceptor electrode comprises a shield having the same DC potential as said chamber wall, and said shield and said chamber wall are AC shorted to each other.

10. The plasma treatment equipment according to claim 1, wherein said susceptor electrode is shorted to a side wall of the chamber wall.

11. Plasma treatment equipment comprising:

a plasma chamber having a bottom wall and a side wall; and

a susceptor electrode disposed within the plasma chamber, said susceptor electrode comprising a generally planar shaped electrode portion oriented substantially parallel to the bottom wall of the plasma chamber, said susceptor electrode further comprising a generally planar shaped shield disposed adjacent to said electrode portion, said shield being located between said electrode portion and the bottom wall of the plasma chamber,

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wherein the bottom wall of the plasma chamber and the shield of the susceptor electrode have the same DC potential,

wherein the bottom wall of the plasma chamber and the shield of the susceptor electrode are AC shorted to each other by a metal plate, said metal plate having a first end connected to a first short point on the shield and a second end connected to a second short point on the bottom wall of the chamber, and wherein the second short point is located within 500 mm of the side wall of the plasma chamber.

12. Plasma treatment equipment comprising:

a plasma chamber having a bottom wall and a side wall; and

a susceptor electrode disposed within the plasma chamber, said susceptor electrode comprising a generally planar shaped electrode portion oriented substan-

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tially parallel to the bottom wall of the plasma chamber, said susceptor electrode further comprising a generally planar shaped shield disposed adjacent to said electrode portion, said shield being located between said electrode portion and the bottom wall of the plasma chamber,

wherein the side wall of the plasma chamber and the shield of the susceptor electrode have the same DC potential, and

wherein the side wall of the plasma chamber and the shield of the susceptor electrode are AC shorted to each other by a metal plate, said metal plate having a first end connected to a first short point on the shield and a second end connected to a second short point on the side wall of the chamber.

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